DEFENSE THREAT REDUCTION AGENCY

Defense Threat Reduction Agency Science and Technology Programs

S&T Initiatives to Shape the Future
Session IV

NDIA DoD Technology Conference
Bridging the Gap: Technology for Future Warfighters

Dr. Mark Byers
April 21, 2005

DTRA is the Department of Defense's expert for reducing WMD threats

The National Strategy to Combat Weapons of Mass Destruction identifies three pillars in protecting the United States:

- Nonproliferation
- Counterproliferation
- Consequence Management

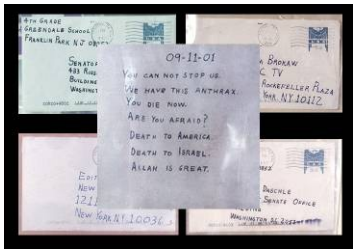
The Department of Defense created DTRA as a combat support agency to be the center of excellence in combati[illegible]MD. The three pillars are integral to D[illegible] mission.

Making the World Safer

WMD can include conventional and disruptive threats

Chemical Weapons

. . .cheap and easy to make



Biological Weapons

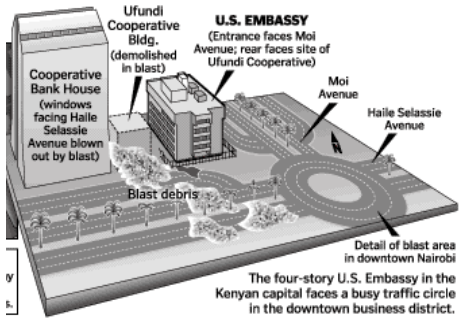
. . .use available technology and are potentially catastrophic

Nuclear Weapons

. . .difficult to acquire, devastating in use

Radiological Devices

. . .dangerous to assemble with high contamination impact


Ufundi Cooperative Bldg. (demolished in blast)
U.S. EMBASSY
(Entrance faces Moi Avenue; rear faces site of Ufundi Cooperative)
Cooperative Bank House (windows facing Haile Selassie Avenue blown out by blast)
Moi Avenue
Haile Selassie Avenue
Blast debris
Detail of blast area in downtown Nairobi
The four-story U.S. Embassy in the Kenyan capital faces a busy traffic circle in the downtown business district.

WMD High Yield Explosive Devices

... can assume many forms, quickly made, quickly dispersed, potentially catastrophic

Toxic Industrial Chemicals/Materials (TIC/TIM)

... commonly transported throughout the country on a daily basis

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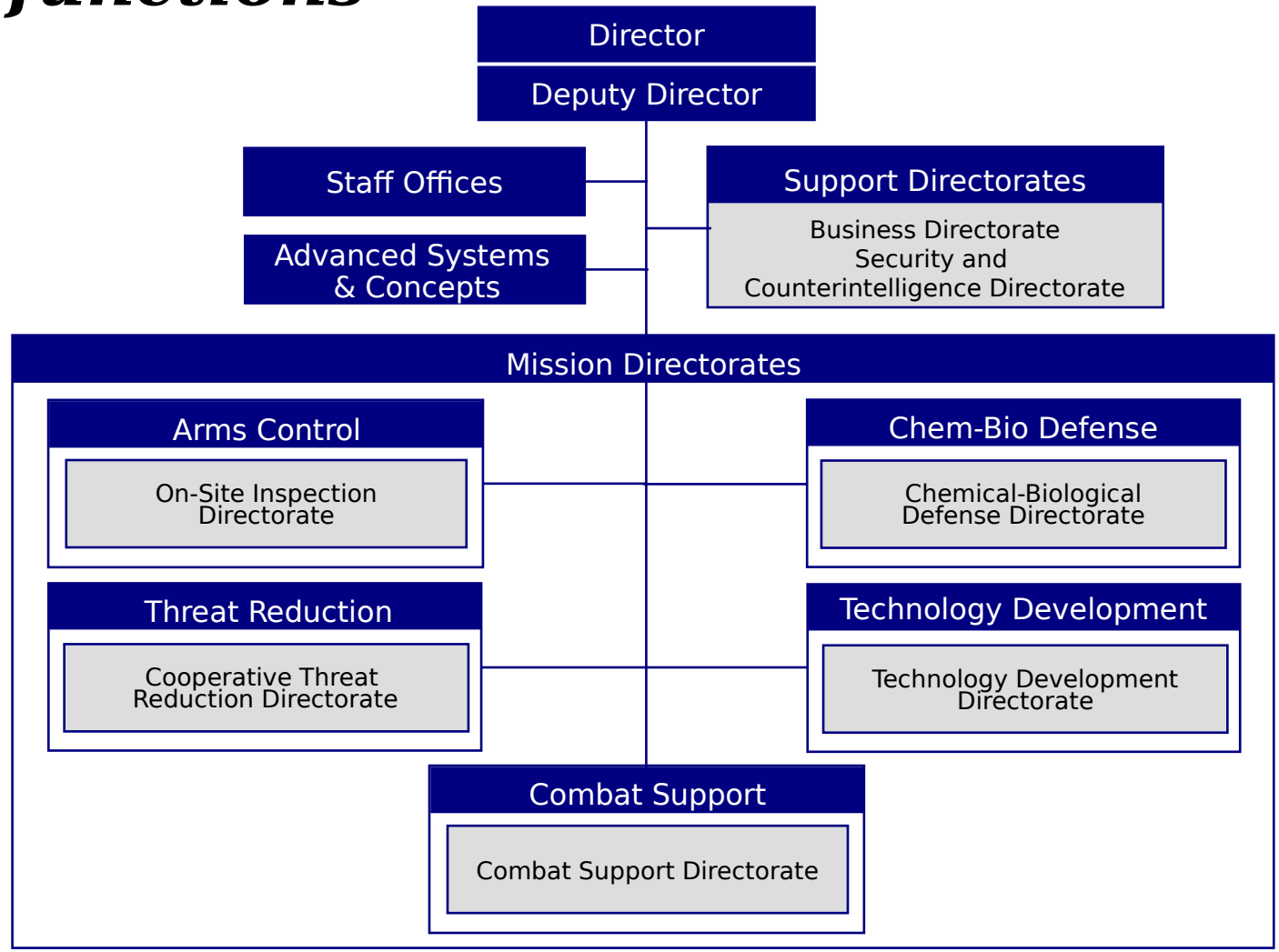
DTRA is organized according to mission functions



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DTRA S&T Goals

Conduct research, develop tools and systems and transition technologies

- Understand WMD threats and potential effects
- Deny enemy sanctuary for WMD
- Defeat WMD threats with minimal collateral effects
- Protect against WMD effects

Programs

Operational Applications

- Modeling and Simulation Integration
- Targeting Support
- Consequence Assessment
- Arms Control Technology
- Operational Support Technology

System Applications

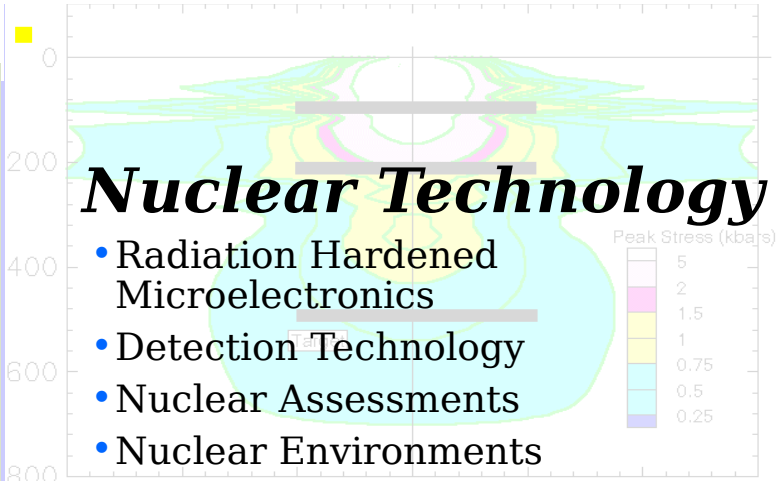
- SOF Technology Support
- Special Projects
- Hard Target Defeat
- WMD Counterforce Applications

Chemical Biological Defense

- Medical Science and Technology
- Physical Science and Technology
- Transition

Nuclear Technology

- Radiation Hardened Microelectronics
- Detection Technology
- Nuclear Assessments
- Nuclear Environments



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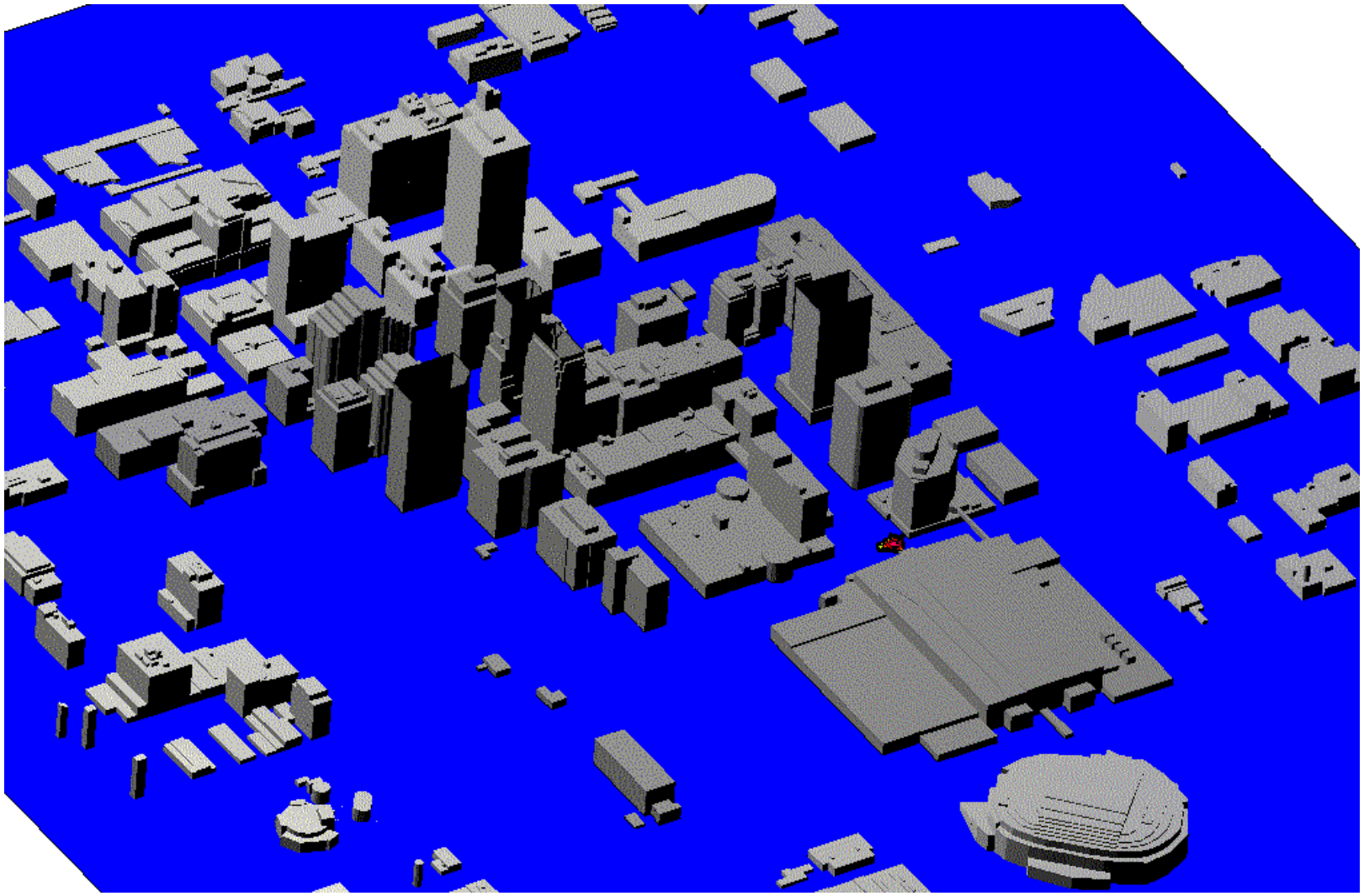
Operational Applications
Major Objectives & Initiati

- Expand Hazard Prediction Capabilities
- Build Underground Targeting and Analysis Tools
- Develop Blast Protection Technologies
- Integrate WMD Tools

Plume Model



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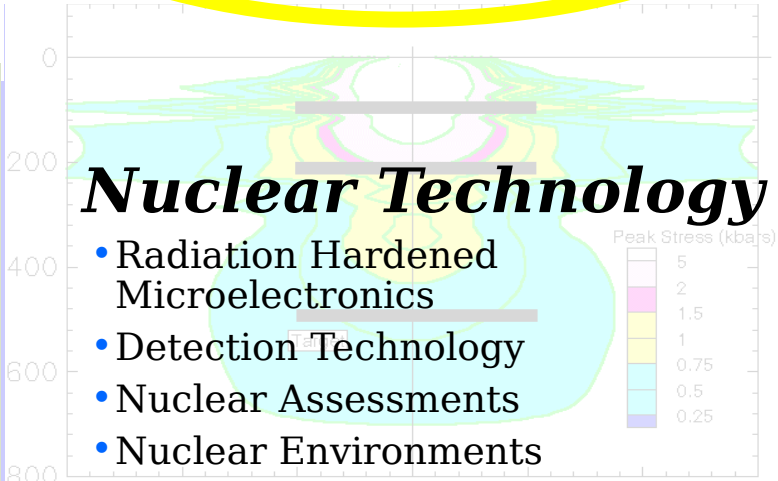

- Radiation Hardened Microelectronics
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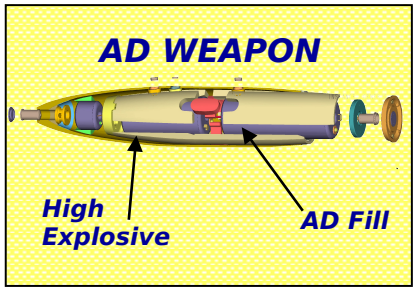
System Applications
Major Objectives & Initiatives

- Develop combat assessment technologies
- Demonstrate Agent Defeat/Deny/Disrupt (AD3) technologies
- Develop Special Operations Forces focused capabilities.
- Complete Thermobaric Advanced Concept Technology Demonstration (ACTD)
- Develop tools and processes to characterize Underground Facilities (UGFs)



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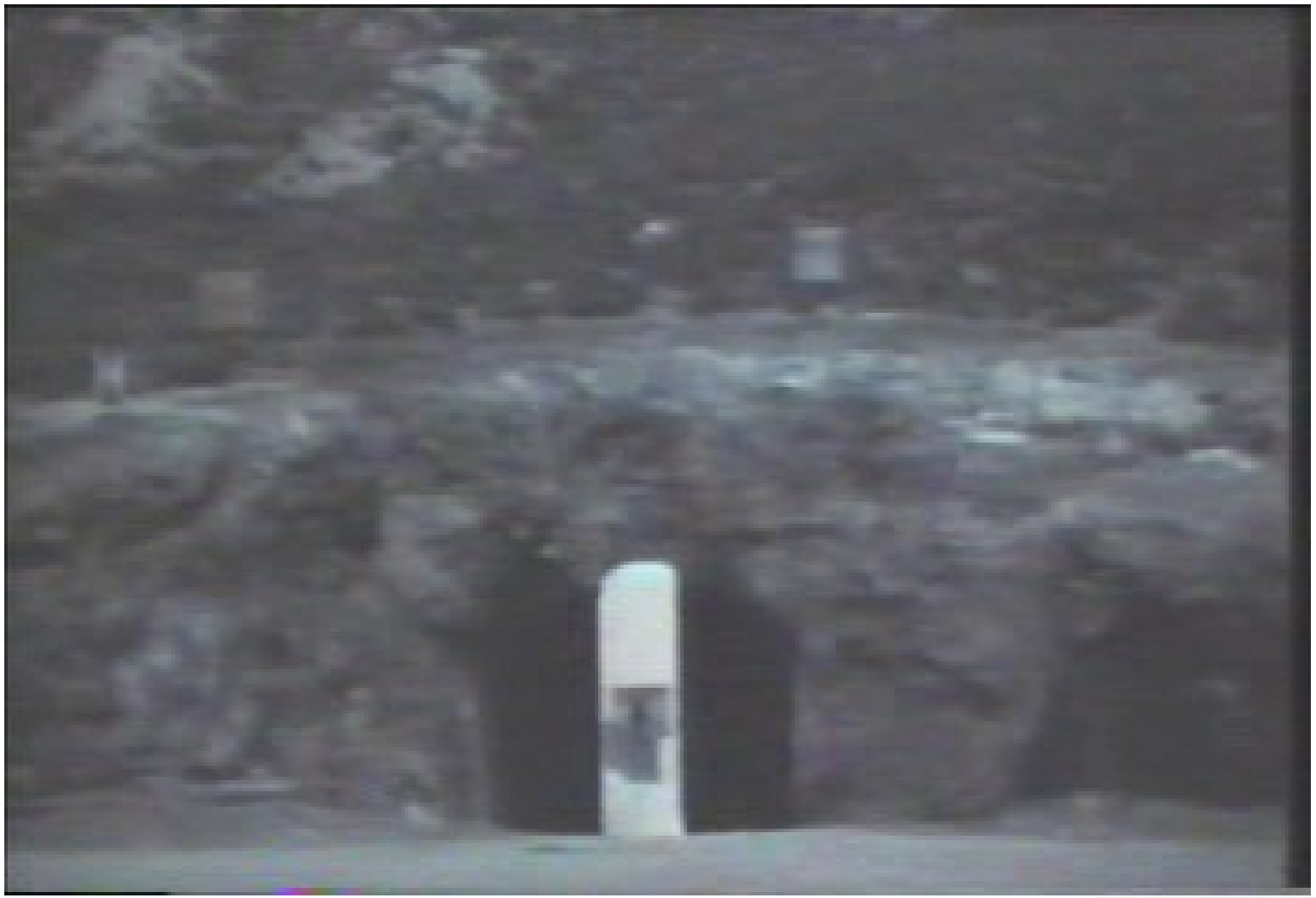
Tunnel Defeat Testing



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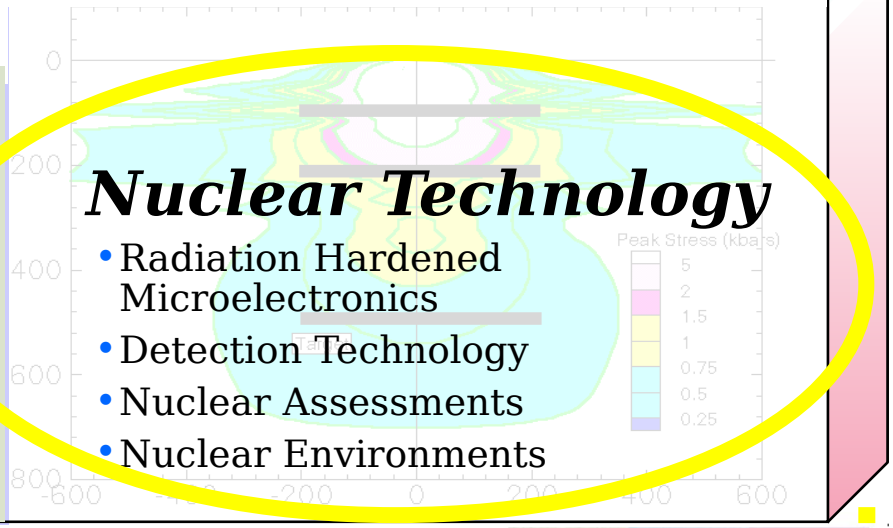

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Nuclear Technology
Major Objectives & Initiatives

- Complete Rad Hard microelectronics 0.15 micron technology
- Develop multi-platform radiation detection systems
- Provide EM hardness assessments and technologies to DoD system managers and develop technologies to harden systems
- Modernize nuclear weapons effects models for 21st century applications

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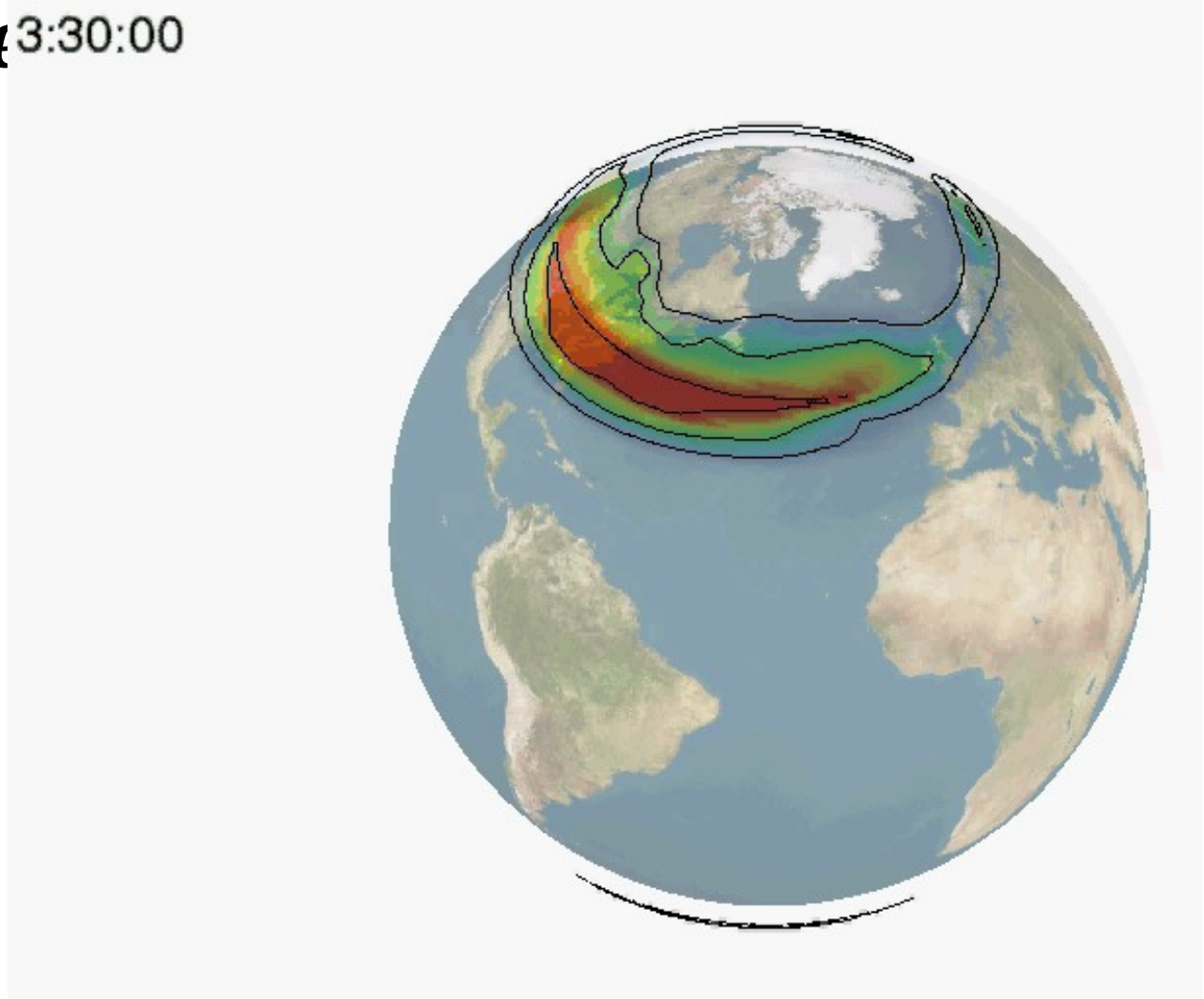
Integrated Space Weather Pre



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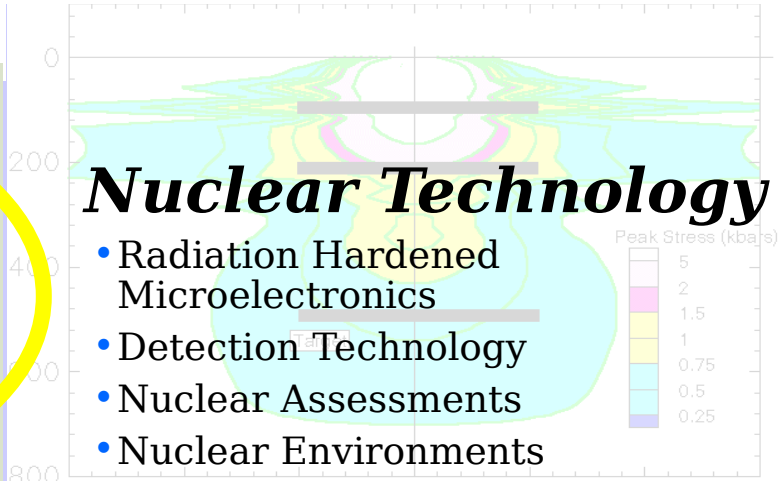

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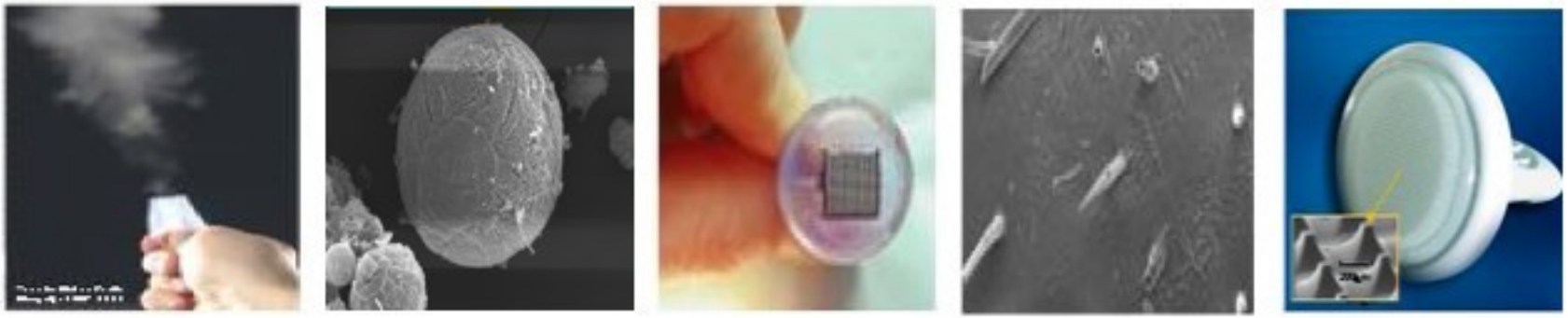
Chemical Biological Defense
Medical Science and Technology
Major Projects

- DNA/molecular vaccines with common vaccine platform and interchangeable antigen cassettes
- Multiagent vaccines and needle-less delivery systems
- Anti-sense ribonucleic acid (RNAi) analog therapeutics
- Recombinant catalytic nerve agent bioscavenger pretreatment
- Improved therapeutics for nerve agent intoxication effective against broader array of agents
- Effective therapeutics against viral and toxin agents
- Better understanding of physiological and behavioral effects of low dose exposure to nerve agents

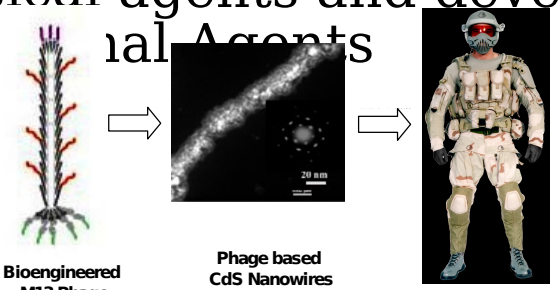


Variety of needle-less methods under development

Chemical Biological Defense Physical Science and Technology Major Objectives & Initiatives

- Develop point and stand-off biodetection capabilities
- Develop self-decontaminating materials
- Demonstrate advanced aerosol protection technologies and advanced closures integrated into Joint Service Lightweight Integrated Suit Technologies
- Develop modeling and simulation and battlespace management tools
- Develop decontaminates that permit rapid restoration of combat power
- Complete Agent Fate and Low-Lev s of classical agents and develop appr Trad al Agents

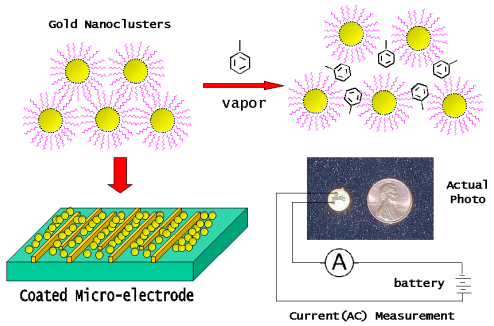
Merging biological recognition with quantum dot nanowires for integration into a flexible, textile based sensor.



Bioengineered M13 Phage

Phage based CdS Nanowires

Quantum dot nanowire textile sensor



Gold nanocluster sensor

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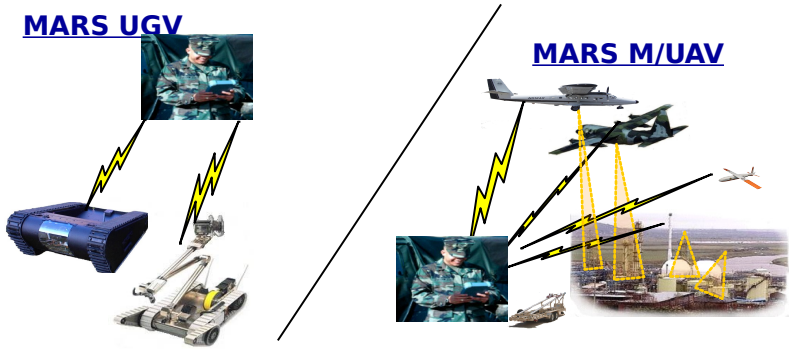
Chemical Biological Defense - Transition Major Objectives & Initiatives

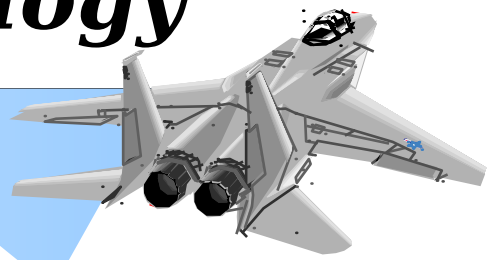
- Support accelerated fielding of operational capabilities (technology, Concepts of Operation and automation tools) to Combatant Commanders and Services through Advanced Concept Technology Demonstrations (ACTDs) and Advanced Technology Demonstrations (ATDs)
  - CBRN Unmanned Ground Reconnaissance ACTD
  - Military Application in Reconnaissance and Surveillance ATD
  - Chemical Biological Training System ATD

CUGR Components: JNBCRS; PacBot UGV; UGV Control Panel



***Military Application in Reconnaissance* and Surveillance**

DTRA Science & Technology Programs



Focused research and development

Transitioned through training, exercises, demonstrations and testing

Supporting warfighters and responde

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